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ABSTRACT

A new approach to the study of memory, "metamemory," takes as its central task the description and explanation of what children know or understand about the nature of memory, the characteristics of their own memories, and the specific techniques they use to store and retrieve information in different task situations. In this study of metamemory, or knowing about knowing, 114 children from first, third, and fifth grade were given four different tasks which assessed their accuracy in predicting future memory. The major goal was to determine if there is cross task consistency in children's metamemorial insight. In addition, actual memory was assessed. Two of the tasks required recall; the remaining two required recognition. For each type, one version involved a word list, the other a sentence list. Contrary to expectation, there was little consistency across tasks in the accuracy with which children predicted recall. Age and type of task did not moderate the weak to modest correlations found. However, in other respects, the findings replicated the major results obtained in previous studies. For recall, children's prediction accuracy increased with age but for recognition there was little change. And for recall (but not for recognition), there was a strong relation between prediction accuracy and actual memory. (Author/RH)

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CONSISTENCY IN THE MEMORY PREDICTIONS OF FIRST, THIRD, AND FIFTH GRADE CHILDREN

by

Steven R. Yussen and Linda Berman

Report from the Project on
Studies of Instructional Programming for the Individual Student

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Abstract

Children from first, third, and fifth grade were given four different tasks which assessed their accuracy in predicting future memory. The major goal was to determine if there is cross task consistency in children's metamemorial insight. In addition, actual memory was assessed. Two of the tasks required recall; the remaining two required recognition. For each type, one version involved a word list, the other a sentence list. Contrary to expectation, there was little consistency across tasks in the accuracy with which children predicted recall. Age and type of task did not moderate the weak to modest correlations found. However, in other respects, the findings replicated the major results obtained in previous studies. For recall, children's prediction accuracy increased with age, but for recognition, there was little change. And for recall (but not for recognition), there was a strong relation between prediction accuracy and actual memory.

In the past several years, a new approach to the study of memory has received a great deal of attention. Dubbed "metamemory," it takes as its central task, the description and explanation of what children know or understand about the nature of memory, the characteristics of their own memories, and the specific techniques they use to store and retrieve information in different task situations. Brown (1978) has called this 'knowing about knowing.'

The recent research literature is packed with stimulating findings describing a number of developmental changes in the growth of memory knowledge (e.g., Brown, 1978; Flavell & Wellman, 1977; Kreutzer, Leonard, & Flavell, 1975). Among other age-related changes, children become increasingly accurate at gauging how much they can recall (e.g., Yussen & Levy, 1975); at understanding the value of different mnemonic study techniques such as rehearsal and categorization (e.g., Brown, 1978); at understanding how to apportion study time (e.g., Masur, McIntyre, & Flavell, 1973); and in thinking up useful strategies to retrieve information (Yussen & Levy, 1977).

As with any new area of inquiry, there are considerable gaps in our knowledge. A significant one is the general absence of any systematic treatment of individual differences. If it is true that some children are more 'knowledgeable' about memory than others, we ought to be able to demonstrate some pattern of consistency or interrelatedness across separate tasks which gauge this insight. Children who offer a fairly accurate prediction of how much they can recall in one circumstance, for example, ought to be more accurate at predicting

how much they can recall in others as well. The alternative, of course, is that there is little consistency in children's judgments.

One of the most well-researched topics in metamemory is the child's ability to approximate or predict how much he or she can remember when faced with some concrete memory task (e.g., Yussen, Note 1). A number of studies have demonstrated that for recall memory, preschool and kindergarten children have unrealistic predictions about what they can remember, with increasingly accurate predictions offered by older children and adults (e.g., Flavell, Friedricks, & Hoyt, 1970; Yussen & Levy, 1975). By contrast, there is little developmental change for recognition memory, with prediction accuracy remaining at a relatively high level (in contrast to recall predictions) from early childhood through adulthood (e.g., Levin, Yussen, DeRose, & Pressley, 1977). In all of this research, however, investigators have failed to examine intra-individual consistency in the accuracy of children's judgments across a range of prediction tasks. If we are to say anything about the general nature of children's memory judgments, it is necessary to have just this sort of evidence for interrelatedness in performances across a sample of different tasks. The major purpose of the present study was to fulfill this goal.

Children from first, third, and fifth grade were presented four memory prediction problems. Two of the problems represented recall and two recognition. This age period was selected, since it is the time during which dramatic changes in prediction accuracy are likely to occur for at least one of the types of tasks (recall).

For each type of memory problem, one task employed words while the other employed sentences. The choice was based on the desire to assess different facets of memory, representing different levels of difficulty (i.e., the sentence problems were expected to be harder than the word problems).

It was predicted that there would be a moderate to strong relation in the predictions offered by the children for the two recall problems. Previous evidence indicates that prediction accuracy is high for all children for recognition memory. Therefore, there is a poor chance of detecting individual differences for recognition. Accordingly, we expected a weaker relation in the predictions offered by the children for the two recognition problems.

The effect of age as a moderating variable on the interrelations among tasks was left as an open-ended issue, since two competing factors are at work. On the one hand, if there is a general tendency to become more 'insightful' with age, as some previous research suggests, then children may also become more consistent and less random in their judgments. On the other hand, greater insight may lead to a reduced degree of variability among members of a group, making the detection of individual differences more difficult.

The second purpose of the study was to retest, with variation, two previous patterns of findings in the literature. One is the observed increase with age in the accuracy with which children gauge their memory span for recall, and the absence of change with age in the accuracy of judging recognition. The second is the finding that

prediction accuracy is highly associated with actual memory performance for recall.

Method

Subjects

A total of 114 children were tested, 38 each in first, third, and fifth grades. Mean ages were 6-11, 9-1, and 11-3, respectively. There were approximately equal numbers of boys and girls tested at each age. The sample was drawn from two elementary schools in rural farm communities near Madison, Wisconsin. Children were primarily white and of lower middle to middle income families.

Design

Each child was presented with four prediction tasks and four actual memory problems. The prediction tasks called for the child to predict his or her own memory span and the actual memory problems required recall or recognition. Metamemory tasks always preceded the actual memory problem with which they were associated.[1] The order of tasks was otherwise randomized. The testing was completed in two separate sessions, separated by no more than a week, by the second author, a female in her mid-twenties.

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[1] Previous research has revealed no clear relation between the order of presenting the two phases of these problems (i.e., metamemory vs. actual memory first) and subsequent performances. To reduce the complexity of an already detailed procedure, it was decided to present the metamemory phase of each task before presenting the corresponding actual memory problem.

Tasks and Stimuli

For all problems described below, the lists were recorded on separate audio cassettes and the subjects listened to each list before the actual memory test. For recall of the word lists, the presentation rate was approximately one word every 2 seconds. For recall of the sentence lists, each sentence was read in from 3 to 5 seconds and there was a 3-second pause between sentences. For the recognition problem, approximately 20 seconds separated the acquisition and test phases, with the time used to remind the child of the recognition format and to change cassettes. In the recognition test, approximately 1/2 second lapsed between successive items within a trio, with the recorded voice asking the child: Did you hear: _____ or _____ or _____. Approximately 2 seconds intervened between trios.

For the metamemory component of each task, the child was asked just prior to the list presentation, to predict how many items (words or sentences) from a possible total of 15 they would correctly remember (recall or recognize). The list was then presented once and actual memory was assessed.

1) Free recall of words. A list of 15 common nouns was constructed. Each one was a concrete, one- or two-syllable item, drawn from a list of 30 words previously used by Levin et al. (1977). There was no simple or obvious set of categories represented by the list, but the items could be categorized.

2) Free recall of sentences. A list of 15 sentences was constructed. Five of the sentences were active (e.g., "The birds flew around the tree");

five were descriptive (e.g., "The pillow is soft and white"); and five were locative (e.g., "The watch is under the dresser"). The sentences were constructed to reflect the different types of constructions found in many sentence memory investigations (e.g., Paris, 1975) and to contain from 3 to 5 simple concepts each. There were no hypotheses about recall for particular types of sentences and children were given partial credit (e.g., 1/3, 1/4, 1/5) for each concept in a sentence they recalled or paraphrased. For example, given the sentence, "The birds flew around the tree," the four concepts are 'birds,' 'flew,' 'around,' and 'tree.' The following recall protocol would receive 3/4 credit: "The robin flies around."

3) Recognition of words. A list of 15 words, having the same attributes as those for task 1 (but, of course, different concrete nouns) was the target set. After this list was presented, the recognition test consisted of selecting each target item from among a trio of words which included two distractors. Distractors were also concrete, one- or two-syllable nouns (again, none overlapping with task 1 nouns) and were selected so as to be dissimilar in meaning to the target items (e.g., baby, door, and grass). Thus, a total of 15 trios (45 words) appeared in recognition.

4) Recognition of sentences. A list of 15 target sentences was constructed as in task 2, with an equal number of active, descriptive, and locative forms. The recognition test consisted of selecting each target item from among a trio of sentences which included two distractors. Since each target sentence was either active, descriptive, or locative,

its associated distractors were chosen from each remaining sentence type and were dissimilar in meaning [e.g., "The juice is in the cup." (locative); "The turtles crawled on the beach." (active); and "The balloon is very red." (descriptive)].

Results and Brief Discussion

To compare the accuracy with which children predicted their actual memory performances, at each grade and for each task, two derived measures were employed, $(P-A)/A$ and $|P-A|/A$. They reflect, respectively, signed and unsigned relative errors in judging one's memory capacity (where P = predicted memory, A = actual memory). These measures have been used previously (Levin et al., 1977; Yussen & Paquette, 1978) and are preferable to simple difference scores. The signed measure indicates the mean over or under prediction of the group, while the unsigned measure indicates the variability in prediction accuracy.

To assess how strongly prediction accuracy scores on the four tasks are associated, Pearson product moment correlations were calculated separately for the signed and unsigned measures and for each age (grade) group. These appear in Tables 1 and 2.

Contrary to expectation, the correlations are on the average very low, and there is no clear pattern for either measure of accuracy at any grade. Setting a conservative alpha level of $p < .01$, to protect against the large number of statistical tests performed on the set of correlations, it can be seen that only 2 of the 18 correlations are significantly greater than zero for the signed measure in Table 1 [i.e.,

Table 1

Correlations Among the Tasks for Prediction Accuracy, Signed Index, $\frac{(P-A)}{A}$, By Grade

Grade and task	Task 1 Recall words (RW)	2 Recall sent (RS)	3 Recognition words (RCGW)	4 Recognition sent (RCGS)
		First		
1 RW		-.07	.20	.34
2 RS			-.09	-.30
3 RCGW				.32
4 RCGS				--
		Third		
1 RW		.09	.26	.35
2 RS			.44*	.01
3 RCGW				.06
4 RCGS				--
		Fifth		
1 RW		.07	.08	-.12
2 RS			.16	.09
3 RCGW				.38*
4 RCGS				--

*$p < .01$.

Table 2

Correlations Among the Tasks for Prediction Accuracy, Unsigned Index, $\frac{|P-A|}{A}$, By Grade

Grade and task	Task 1 Recall words (RW)	2 Recall sent (RS)	3 Recognition words (RCGW)	4 Recognition sent (RCGS)
		First		
1 RW		-.08	.09	.16
2 RS			.10	.40*
3 RCGW				.02
4 RCGS				--
		Third		
1 RW		.17	-.41*	-.31
2 RS			-.09	-.06
3 RCGW				.45*
4 RCGS				--
		Fifth		
1 RW		.12	-.15	.03
2 RS			.03	-.13
3 RCGW				.12
4 RCGS				

*$p < .01$.

(P-A)/A], and only 3 of the 18 correlations are significantly greater than zero for the unsigned measure [(P-A)/A] in Table 2. Adding to the apparent randomness, one of the significant correlations is negative. In addition, the correlations which reach significance are different for the two measures (for the signed index, it is tasks 2 and 3 for third graders and 3 and 4 for fifth graders; for the unsigned index it is tasks 1, 3, and 4 for third graders, and 2 and 4 for first graders).

Contrary to our hypothesis, the accuracy with which children judge their memory capability is highly variable across tasks during the age periods studied. There is no evidence that children's level of accuracy is more consistent in gauging recall than recognition performance, or that age (grade) is strongly related to the degree of consistency.

One possibility is that some feature of the present design created a different pattern of results for the sample of children tested here as compared with those in previous investigations. In some respect, the sample and tasks we chose may be unrepresentative or "noisy." To evaluate this idea, we examined the similarities between other aspects of our results and parallel data obtained previously.

First, consider the age (grade) related changes in prediction accuracy. These are shown in Table 3 (for the signed index) and Table 4 (for the unsigned index), separately for each task. For each index, a series of five planned comparisons was performed, four testing for a developmental increase in accuracy for each task (i.e., a numerical

Table 3

Means and Standard Deviations for Prediction Accuracy

By Grade and Task: Signed Index, $\frac{(P-A)}{A}$

	Task	Grade					
		First		Third		Fifth	
		M	SD	M	SD	M	SD
1	Recall words	1.53	1.78	.88	.91	.39	.45
2	Recall sentences	3.57	5.89	1.56	1.22	1.32	1.63
3	Recognition words	- .08	.69	- .21	.35	- .09	.32
4	Recognition sentences	- .21	.43	- .35	.24	- .33	.24

Table 4

Means and Standard Deviations for Prediction Accuracy

By Grade and Task: Unsigned Index, $\frac{|P-A|}{A}$

	Task	Grade					
		First		Third		Fifth	
		M	SD	M	SD	M	SD
1	Recall words	1.61	1.71	.96	.82	.44	.40
2	Recall sentences	3.61	5.87	1.58	1.18	1.36	1.59
3	Recognition words	.55	.41	.33	.22	.24	.23
4	Recognition sentences	.40	.25	.37	.19	.37	.18

decrease in the prediction or deviation index across grades), and one testing for superior prediction accuracy for recognition tasks as opposed to recall tasks, collapsed across grades and type of task (i.e., sentences, words). To be more conservative than the corresponding, but less efficient analysis of variance format that might have been adopted [i.e., a 3(grade) X 4(task) repeated measures ANOVA], the error rate for each family of statistical comparisons was set at $\alpha = .15$, or, for each individual statistical test, $\alpha = .15/5 = .03$. For the signed measure (Table 3) the critical value for a difference in means is 1.26 ($t = 2.86$, $df = 333$, *MS* error = 3.70) and for the unsigned measure (Table 4), the critical value is 1.25 ($t = 2.86$, $df = 333$, *MS* error = 3.53). The comparisons revealed significant (sentences) or near significant (words) increases in prediction accuracy for recall for both indices, but no significant change for either recognition task for either index. And, for both indices, the overall level of prediction accuracy was greater for the recognition problems than for the recall problems.

Thus, in several important respects, the results do replicate previous findings (e.g., Levin et al., 1977; Yussen & Levy, 1975). There is a significant increase in the accuracy with which recall memory is gauged across the elementary school years, with every group overestimating performance. But, there is little age related change in accuracy for recognition memory, perhaps because recognition memory is gauged more accurately to begin with.

Finally, for one other aspect of the results, the current data fit well with previous findings. Table 5 shows the Pearson product moment correlations between metamemory and actual memory for each task and grade. Only correlations involving the unsigned measure are reported, since the signed measure can take on both positive and negative values and the resulting correlation would not be meaningful. As can be seen, the association between prediction accuracy and actual memory is highly significant at each grade for both recall problems (1 and 2), but weak to moderate for word (3) and sentence (4) recognition. These findings are consistent with those obtained by Levin et al., (1977).

Conclusions

Surprisingly, children's judgments were quite variable. Although a few of the correlations among metamemorial predictions were significant, overall, the pattern reflected little consistency in prediction accuracy. Consistency was not moderated by the type of memory problem (recall vs. recognition) as expected, nor by the age of subjects or the content of memory (words or sentences). These findings, although essentially negative, are quite important for the study of metamemory. They indicate that, at least for prediction accuracy, there is no singular, quantitatively consistent "insight" that develops during the elementary school years.

Although the group patterns of change reflect an increase in prediction accuracy for the two recall problems, they obscure the fact that the "improvement" may be due to some children predicting more accurately for one task and other children predicting more accurately for the second

Table 5

Correlation[a] Between Predicted Recall,

Unsigned Index, $\frac{|P-A|}{A}$, and Actual Recall,

By Grade

Grade	Task			
	1 Recall words	2 Recall sent	3 Recog words	4 Recog sent
First (1)	-.73*	-.55*	-.31	-.08
Third (3)	-.69*	-.76*	.19	.34
Fifth (5)	-.70*	-.71*	-.21	.15

[a]In all cases, a negative correlation indicates a positive conceptual relation between prediction accuracy and actual recall, since a higher prediction accuracy is reflected in a lower score.

*$p < .01$.

one. The object lesson is that caution must be exercised in constructing tasks designed to assess some facet of metamemory in children. In addition to sampling children of different ages, we must sample tasks which measure the same cognitive item that is supposed to develop.

Although it is easy to dismiss any negative findings of a study on the basis of some flaw in the experimental design or procedure, such a dismissal is not warranted here. The current results agree with other published findings when one examines age group differences on a task-by-task basis or the strong association between metamemory judgments and actual memory performance for recall.

Elsewhere (Yussen, Note 1), the problem of how to appropriately measure children's 'knowledge of their memory span' has been raised. Yussen argued that a multimeasure, multitask approach must be taken to arrive at the most convincingly general pattern of findings in metamemory. It may be that prediction accuracy, at least as conceptualized here, is not sensitive to individual differences. Children may become increasingly aware of broad limits to what they can remember and the range of outcomes likely to occur for a given type of memory problem, without having a precise fix on their exact span for a given problem. If so, measures which ask children to identify a range of outcomes or to select from among alternative ranges of performance, may be more directly sensitive to their developing insights.

Reference Note

1. Yussen, S. R. How much can I remember? Paper presented at the meetings of the Society for Research in Child Development, San Francisco, March 1979.

References

Brown, A. L. Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), Advances in instructional psychology. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1978.

Flavell, J. H., Friedricks, A. G., & Hoyt, J. D. Developmental changes in memorization processes. Cognitive Psychology, 1970, 1, 324-340.

Flavell, J. H., & Wellman, H. M. Metamemory. In R. V. Kail & J. W. Hagen (Eds.), Perspectives on the development of memory and cognition. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1977.

Kreutzer, M. A., Leonard, C., & Flavell, J. H. An interview study of children's knowledge about memory. Monographs of the Society for Research in Child Development, 1975, 40(1), Serial number 159.

Levin, J. R., Yussen, S. R., DeRose, T. M., & Pressley, J. M. Developmental changes in assessing recall and recognition memory capacity. Developmental Psychology, 1977, 13, 608-615.

Masur, E. R., McIntyre, C. W., & Flavell, J. H. Developmental changes in apportionment of study time among items in a multitrial free recall task. Journal of Experimental Child Psychology, 1973, 15, 237-246.

Paris, S. G. Integration and inference in children's comprehension and memory. In F. Restle, R. Shiffrin, J. Castellan, H. Lindman, & D. Pisoni (Eds.), Cognitive theory (Vol. I). Hillsdale, N.J.: Lawrence Erlbaum Associates, 1975.

Yussen, S. R., & Levy, V. M. Jr. Developmental changes in knowledge about different retrieval problems. Developmental Psychology, 1977, 13, 114-120.

Yussen, S. R., & Levy, V. M. Jr. Developmental changes in predicting one's own span of short-term memory. Journal of Experimental Child Psychology, 1975, 19, 502-508.

Yussen, S. R., & Paquette, N. Developmental changes in predicting recognition memory for semantically related and unrelated sentences. Developmental Psychology, 1978, 14, 107-113.

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